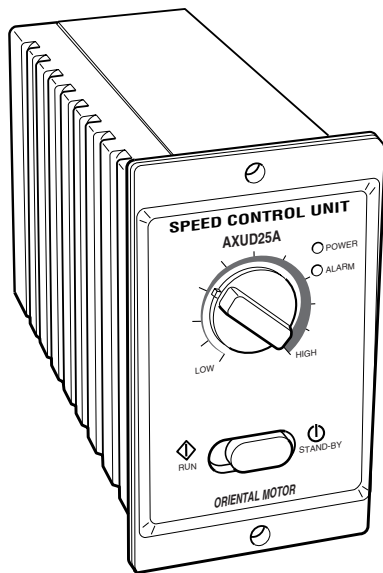




Brushless DC motor and control unit

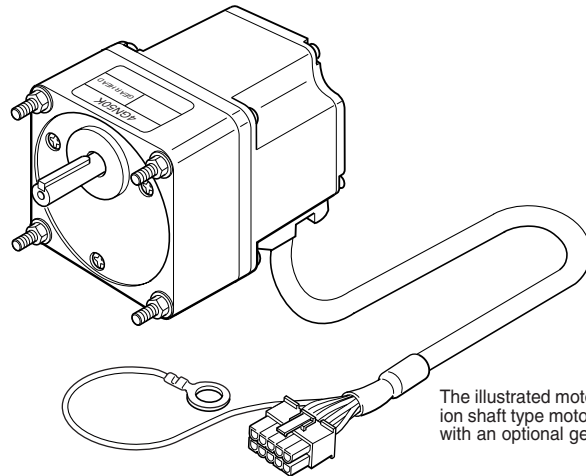
AXU Series

OPERATING MANUAL



Introduction

The **AXU** series is a brushless DC motor and control unit adopting a thin, high-torque brushless DC motor and a small-sized compact control unit. The **AXU** allows motor speed setting and Start/Stop operation to be controlled only by the control unit. This series is well suited for the speed control of transfer equipment and agitators which do not frequently change speed. The **AXU** is available in three types; (1) single-phase 100-115V, 50/60Hz, (2) single-phase 200-230V, 50/60Hz, and (3) three-phase 200-230V, 50/60Hz. The motor shaft is available in two types; a pinion shaft type where the gearhead (optional) can be directly coupled, and a round shaft type which is the optimum for the application requiring high speed rotation.



The illustrated motor is a pinion shaft type motor provided with an optional gearhead.

This product is designed to be incorporated in the general industrial machinery, and must not be used for other purposes. It should be noted in advance that ORIENTAL MOTOR CO., LTD. is not responsible for any damages caused by ignoring this warning.

- No part or whole of this Instruction Manual may be reproduced or copied without prior permission of ORIENTAL MOTOR CO., LTD.

When you have damaged or lost the Manual, please contact our local sales office located nearest to you to get a new one.

- This Manual is subject to change without prior notice due to product improvement, revision of the specifications improvement of the Manual itself.

- We are making efforts to ensure that the Manual carries correct information at all times. Should you find any ambiguous statement, description error or insufficient description, please contact our sales office located nearest to you. The service center locations are listed at the end of this manual.

VEXTA is a trademark of ORIENTAL MOTOR CO., LTD. registered in Japan and other countries.

The product names of other companies described in this Manual are given only for reference, and are not meant to force or recommend their use. ORIENTAL MOTOR CO., LTD. is not responsible for the performances of other manufacturers's products or their use.

Thank you for purchasing an Oriental Motor product. This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

Safety precautions

Only qualified personnel should work with the product. Use the product correctly after thoroughly reading the section "Safety precautions". The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Use the product only after carefully reading and fully understanding these instructions.



Warning

Handling the product without observing the instructions that accompany a "Warning" symbol may result in serious injury or death.



Caution

Handling the product without observing the instructions that accompany a "Caution" symbol may result in injury or property damage.

NOTE

The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product.

Warning

- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock or injury.
- Assign qualified personnel the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Failure to do so may result in fire, electric shock or injury.
- Do not transport, install the product, perform connections or inspections when the power is on. Always turn the power off before carrying out these operations. Failure to do so may result in electric shock.
- When the protection function is triggered, shut off the power immediately. Turn the power back on only after removing the cause. Continuing the operation without removing the cause of the problem may cause malfunction of the motor and control unit, leading to injury or damage to equipment.
- To prevent the risk of electric shock, use the motor and control unit for class I equipment only.
- When install the motor and control unit, ground them to prevent the risk of electric shock.
- Keep the control unit's input-power voltage within the specified range to avoid fire and electric shock.
- Connect the cables securely according to the wiring diagram in order to prevent fire and electric shock.
- Do not rework or modify the motor cable and extension cable (sold separately). Do not remove the sheath of the cable and then ground or touch the shielded wire. This may cause electric shock or trigger the ground fault interrupt circuit.
- Be sure to install the terminal cover of the power connection terminal and input/output signal connection terminal after making connections. Otherwise, fire and electric shock may occur.
- Do not forcibly bend, pull or pinch the cable. Doing so may fire and electric shock.
- Turn off the control unit power in the event of a power failure, or the motor may suddenly start when the power is restored and may cause injury or damage to equipment.
- Do not use it in a vertical application. When the control unit protection function is activated, the motor will stop and movable portions may fall down to cause injury of the operator and damage of the equipment.
- Do not touch the terminals block of the control unit immediately after the power is turned off (for a period of 10 seconds). Failure to do so may result in electric shock.
- Do not disassemble or modify the motor, gearhead or control unit. This may cause electric shock or injury. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.

Caution

- Do not use the motor and control unit beyond their specifications, or electric shock, injury or damage to equipment may result.
- Keep objects out of the openings in the control unit, or electric shock, injury or damage to equipment may result.
- Do not touch the motor and control unit during operation or immediately after stopping. The surfaces are hot and may cause a burn.
- Do not hold the motor output shaft or motor cable. This may cause injury.
- Keep the area around the motor and control unit free of combustible materials in order to prevent fire or a burn.
- Provide a cover over the rotating parts (output shaft) of the motor to prevent injury.
- Do not allow your finger to be caught between the motor and gearhead when the motor (pinion shaft) and gearhead are combined. This may cause injury.
- Do not allow your finger to be caught between the equipment and motor or gearhead when installing the motor or motor with gearhead on the equipment. This may cause injury.
- Use a motor and control unit only in the specified combination. An incorrect combination may cause a fire.
- To avoid injury, remain alert during operation so that the motor can be stopped immediately in an emergency.
- When an abnormality is noted, stop the operation immediately and turn off the control unit power, or fire, electric shock or injury may occur.
- The motor's surface temperature may exceed 70°C, even under normal operating conditions. If a motor is accessible during operation, post a warning label shown in the figure in a conspicuous position to prevent the risk of burns.
- Use a insulated Phillips screwdriver for adjusting the slow start/slowdown time setting potentiometer of control unit. Otherwise, electric shock may occur.
- When testing the insulation resistance or dielectric strength, do not touch the terminal. Otherwise, electric shock may occur.
- When disposing of the motor and control unit, treat them as ordinary industrial waste.



Warning label

Safety standards and CE marking

Motors and control units have been designed and inspected according to the following standards.

Subject	Standards	Certification Body	Standards File No.	CE Marking
Motor	UL1950	UL	E208200	Low Voltage Directive
	CSA C22.2 No.950			
	EN60950	Conformed to EN Standards		
	EN60034-1			
EN60034-5				
Control unit	UL508C*	UL	E171462	
	CSA C22.2 No.14			
	EN60950	Conformed to EN Standards		
	EN50178			

* For UL standard (UL508C), the product is recognized for the condition of Maximum Surrounding Air Temperature 40°C.

NOTE

- The EMC measurements required under standard EN50178 are not performed separately for motors and control units. Perform the EMC test when they are incorporated into the final product.
- The overvoltage protection test required under standard EN50178 is not performed. Perform the test when incorporated into the final product.

● Installation Conditions

Overvoltage category III, Pollution degree 2, Class I (For EN Standard)

When the machinery to which the control unit is mounted requires pollution degree 3 specifications, install the control unit in a cabinet that complies with IP54.

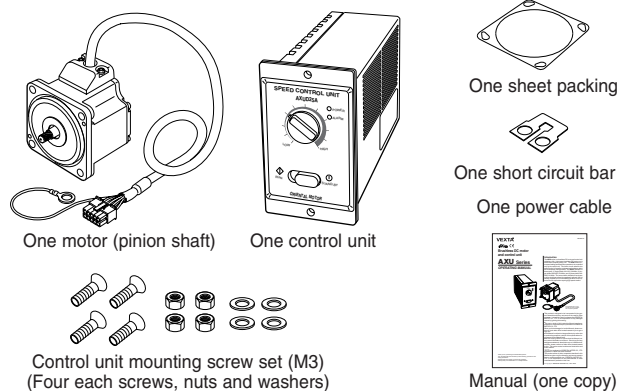
Checking the products

Open the package and make sure that the following items are supplied.

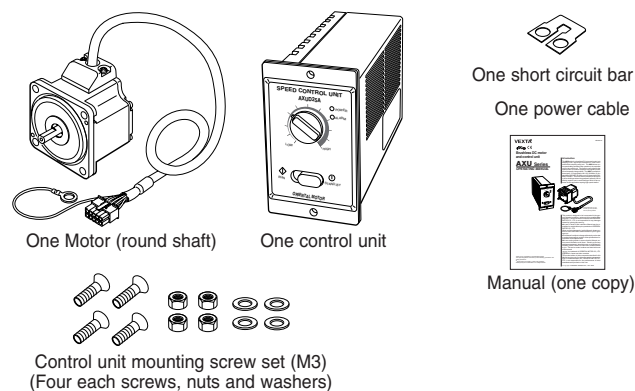
If there is any shortage or damage, contact the sales office where you bought the product.

The unit name of the product you bought should be checked by reference to the name on the label of the package. Check the names of motor and driver by reference to the names on the name plate of each product. The Table below shows the combination of the motor and control unit according to unit names.

Pinion shaft type



Round shaft type



Combinations of motors and control units

■ For single-phase 100V-115V

Unit name	Motor name	Control unit name
AXU210A-GN	AXUM210-GN	AXUD10A
AXU425A-GN	AXUM425-GN	AXUD25A
AXU540A-GN	AXUM540-GN	AXUD40A
AXU590A-GU	AXUM590-GU	AXUD90A

■ For single-phase 200V-230V

Unit name	Motor name	Control unit name
AXU210C-GN	AXUM210-GN	AXUD10C
AXU425C-GN	AXUM425-GN	AXUD25C
AXU540C-GN	AXUM540-GN	AXUD40C
AXU590C-GU	AXUM590-GU	AXUD90C

■ For three-phase 200V-230V

Unit name	Motor name	Control unit name
AXU210S-GN	AXUM210-GN	AXUD10S
AXU425S-GN	AXUM425-GN	AXUD25S
AXU540S-GN	AXUM540-GN	AXUD40S
AXU590S-GU	AXUM590-GU	AXUD90S

Combinations of motors and control units

■ For single-phase 100V-115V

Unit name	Motor name	Control unit name
AXU210A-A	AXUM210-A	AXUD10A
AXU425A-A	AXUM425-A	AXUD25A
AXU540A-A	AXUM540-A	AXUD40A
AXU590A-A	AXUM590-A	AXUD90A

■ For single-phase 200V-230V

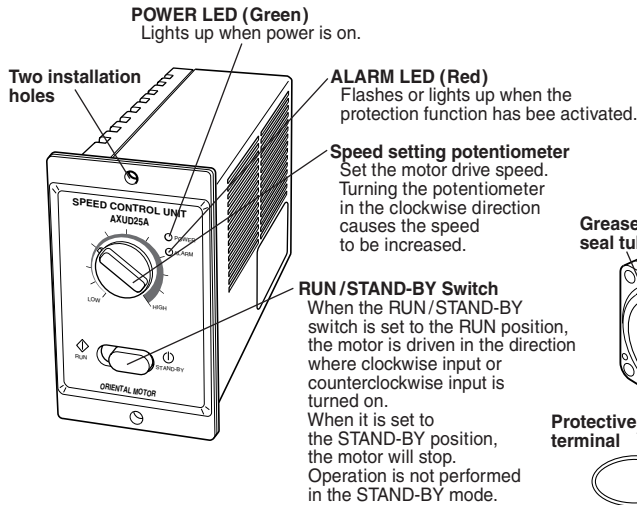
Unit name	Motor name	Control unit name
AXU210C-A	AXUM210-A	AXUD10C
AXU425C-A	AXUM425-A	AXUD25C
AXU540C-A	AXUM540-A	AXUD40C
AXU590C-A	AXUM590-A	AXUD90C

■ For three-phase 200V-230V

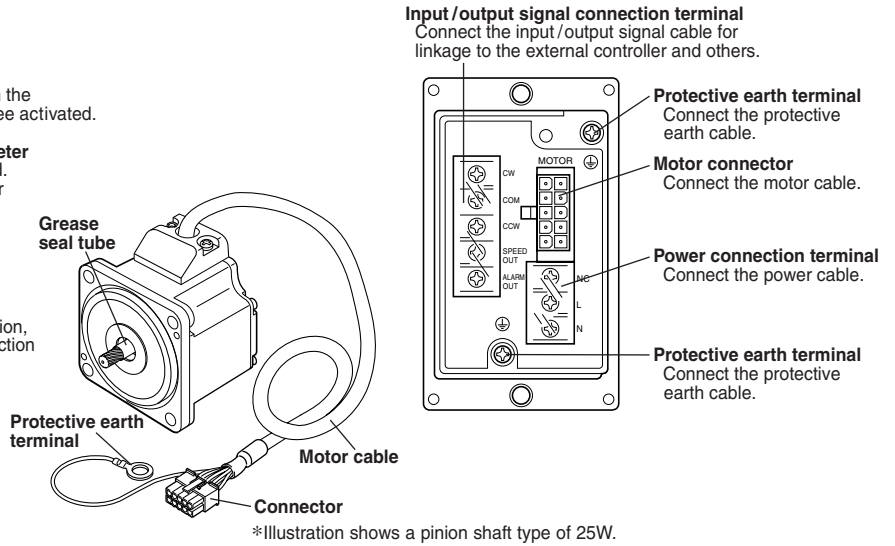
Unit name	Motor name	Control unit name
AXU210S-A	AXUM210-A	AXUD10S
AXU425S-A	AXUM425-A	AXUD25S
AXU540S-A	AXUM540-A	AXUD40S
AXU590S-A	AXUM590-A	AXUD90S

Names and functions of individual components

■ Front of Control Unit



■ Back of Control Unit



Installation

Installation site

The motor (gearhead) and control unit are designed and manufactured to be incorporated into the equipment. Install them in a site which ensures effective ventilation and easy inspection and meets the following conditions:

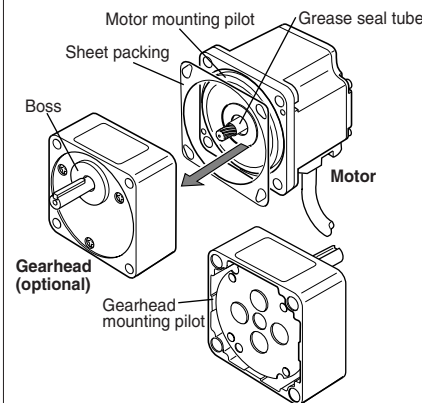
- ◆ Indoors
 - ◆ Ambient temperature
Motor: 0°C ~ +50°C (+32°F ~ +122°F)
(freezing not allowed)
Control unit: 0°C ~ +40°C
(+32°F ~ +104°F)
(freezing not allowed)
 - For UL and CSA standards, the product is recognized for the condition of ambient temperature, 0°C ~ +40°C (+32°F ~ +104°F).
 - ◆ Ambient humidity: 85% or less
(dew condensation not allowed)
 - ◆ Not in the explosive or hazardous atmosphere
 - ◆ Not exposed to sunlight
 - ◆ Not exposed to dust or conductive particles
 - ◆ Not splashed with water, oil or other liquid
 - ◆ Not subjected to continuous vibration or excessive shock
 - ◆ No radiation, magnetic field or vacuum atmosphere in the vicinity
 - ◆ Overvoltage category III, Pollution degree 2, Class I (For EN Standard)
- When the machinery to which the control unit is mounted requires pollution degree 3 specifications, install the control unit in a cabinet that complies with IP54.

Installation of motor (gearhead)

Install the motor (gearhead) on a metallic plate having an excellent resistance to vibration and providing high heat conduction. Keep the motor case temperature at 90°C (194°F) or less.

Pinion shaft type

- 1** Install the attached sheet packing on the motor installation surface, and mount the gearhead. For 10W, 25W and 40W type, **GN** type is the only pinion shaft type of the gearhead that can be mounted. For 90W type, **GU** type is the only pinion shaft type of the gearhead that can be mounted.

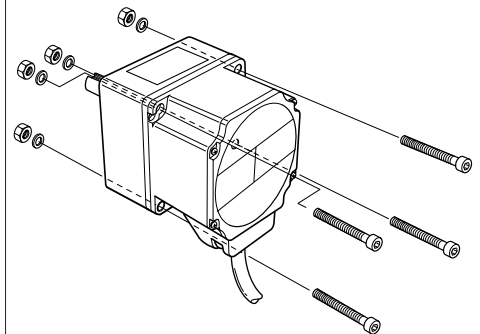


NOTE

- Without removing the grease seal tube (white) on 10W and 25W types attached to the pinion shaft, mount it on the gearhead. If this tube is removed, gearhead grease will flow into the motor, and this may cause the motor to be damaged.
- When the motor and gearhead are assembled, use each mounting pilot as a guide, and turn the gearhead slowly to the right and left, taking care to prevent the threaded portion of the motor from heavily hitting the side plate of the gearhead or the gear. Then assemble them in position.

2

Using the four installation holes, lock the motor with four installation screws of the gearhead so that there is no gap with the metallic plate.



NOTE

The boss located on the gearhead installation surface should be inserted into the countersunk or drilled-through mounting pilot hole.

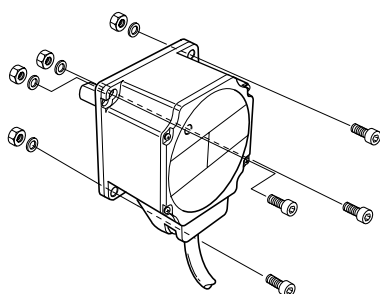
■ Tightening torque

Unit name	Bolt designation	Tightening torque
AXU210□-GN	M4	1.8 N·m (15.9 lb-in)
AXU425□-GN	M5	3.8 N·m (33 lb-in)
AXU540□-GN	M6	6.4 N·m (56 lb-in)
AXU590□-GU (5GU□KB)	M6	6.4 N·m (56 lb-in)
AXU590□-GU (5GU□KBH)	M8	15.5 N·m (137 lb-in)

"A", "C" or "S" showing voltage specifications is put in "□" of the unit product name. The gear ratio appears at the position in the gearhead model number indicated by the box (□).

Round shaft type

Using the four installation holes, mount the motor with four screws and nuts (not included) so that there is no gap with the metallic plate.



NOTE

- The mounting pilot on the motor installation hole should be inserted into the countersunk or drilled-through mounting pilot hole.
- The round shaft should be mounted on the metallic plate of the following dimensions so that the motor case temperature will be 90°C (194°F) or less.

Unit name	Heat radiation plate dimensions	Thickness
AXU210□-A	135mm x 135mm (5.3in x 5.3in)	5mm (0.2in)
AXU425□-A	165mm x 165mm (6.5in x 6.5in)	
AXU540□-A	200mm x 200mm (7.9in x 7.9in)	
AXU590□-A	200mm x 200mm (7.9in x 7.9in)	

“A”, “C” or “S” showing voltage specifications is put in “□” of the unit product name.

Tightening torque

Unit name	Bolt designation	Tightening torque
AXU210□-A	M4	1.8N·m (15.9lb-in)
AXU425□-A	M6	6.4N·m (56lb-in)
AXU540□-A	M8	15.5N·m (137lb-in)
AXU590□-A	M8	15.5N·m (137lb-in)

“A”, “C” or “S” showing voltage specifications is put in “□” of the unit product name.

Load installation

When mounting a load on the motor and gearhead, make sure that the centerline is aligned between the motor output shaft or gearhead output shaft and load shaft.

The 2GN type gearhead output shaft and round shaft type motor output shaft are provided with milling. Use a double-point screw to fix it firmly to the milled portion, thereby preventing load from rotating on the shaft.

The 4GN, 5GN, 5GU type gearhead output shaft is provided with key-grooves. A key groove should also be provided on the load side to be mounted. Mount it firmly by the key of the gearhead.

◆ Direct coupling connection

Make sure of a straight centerline between the motor (gearhead) output shaft and load shaft.

◆ Belt connection

Make sure that the motor (gearhead) output shaft and load shaft will be parallel to each other. Ensure that the line connecting the centers of both pulleys is at a right angle to the shaft.

◆ Gear connection

Make sure that the motor (gearhead) output shaft and gear shaft will be parallel to each other. Ensure that the gear teeth mesh properly.

NOTE

- When mounting the coupling or pulley to the motor output shaft or gear output shaft, take care not to damage the output shaft or bearing.
- When connecting the motor (gearhead) with the load, pay attention to centering, belt tension and pulley parallelism. The coupling and pulley locking screws must be tightened firmly.
- Do not modify or machine the motor (gearhead) output shaft. You may damage the bearing, motor or gearhead.

Overhang load and thrust load

Ensure that overhung load applied to the motor shaft does not exceed the tolerance shown in the Table below.

Avoid thrust load wherever possible. If it has to be applied, it should not exceed half the motor mass. Should it exceed the tolerance, the motor (gearhead) bearing and output shaft may be subjected to fatigue damage due to repeated load.

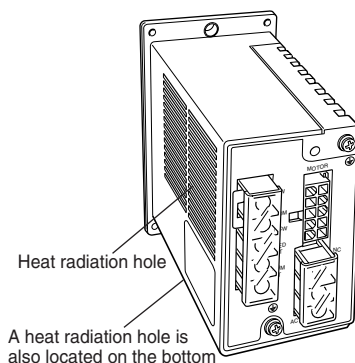
Unit/gearhead name	Overhang load	
	Distance from the shaft end 10mm (0.4in)	20mm (0.8in)
AXU210□-A	70N (15.7lb)	100N (22lb)
AXU425□-A	120N (27lb)	140N (31lb)
2GN3K ~ 2GN18K	50N (11.2lb)	80N (18lb)
2GN25K ~ 2GN180K	120N (27lb)	180N (40lb)
4GN3K ~ 4GN18K	100N (22lb)	150N (33lb)
4GN25K ~ 4GN180K	200N (45lb)	300N (67lb)
5GN3K ~ 5GN18K	250N (56lb)	350N (78lb)
5GN25K ~ 5GN180K	300N (67lb)	450N (101lb)
5GU3KB ~ 5GU9KB	400N (90lb)	500N (112lb)
5GU12.5KB ~ 5GU18KB	450N (101lb)	600N (135lb)
5GU25KB ~ 5GU180KB	500N (112lb)	700N (157lb)
5GU50KBH ~ 5GU180KBH	400N (90lb)	600N (135lb)

“A”, “C” or “S” showing voltage specifications is put in “□” of the unit product name.

Installation of control unit

Direction of installation

The control unit is designed based on the assumption of heat radiation due to air convection. When you want to install the control unit inside the housing, install it to ensure that one of two heat radiation holes of the control unit faces downward.



NOTE

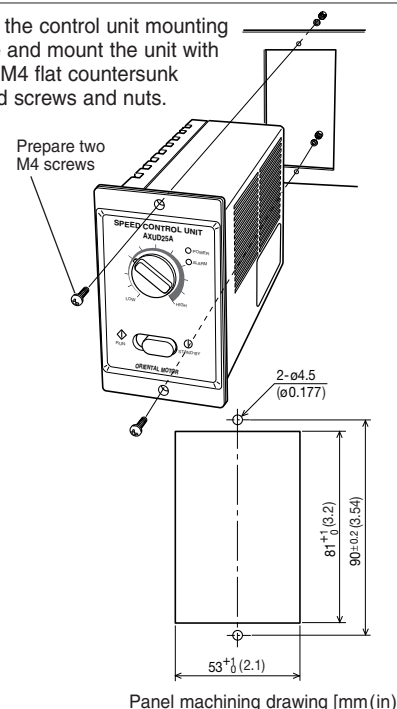
- Install the control unit 25mm (1in) or more away from the housing and other equipment inside the housing in the horizontal direction, and 50mm (2in) or more away in the vertical direction.
- Around the control unit, do not install the equipment which generates a great deal of heat or noise.
- If the ambient temperature of the control unit exceeds 40°C (104°F), review the ventilation conditions or forcibly cool control unit with a fan.

Installation method

Install the control unit on the metallic plate having an excellent resistance to vibration.

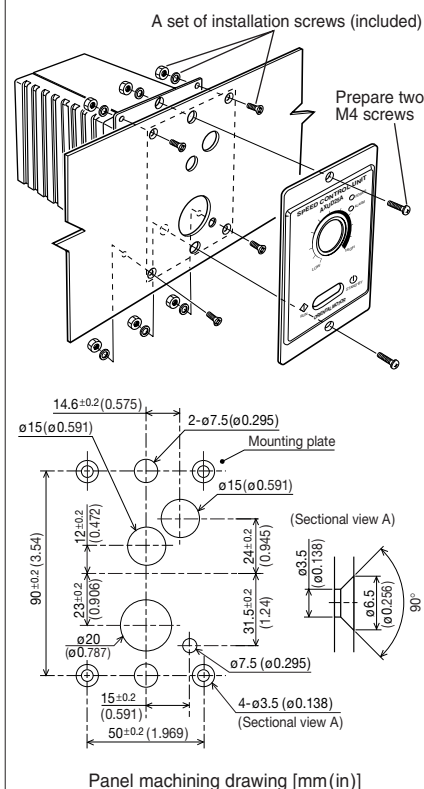
When mounting the unit by drilling a rectangular hole

Use the control unit mounting hole and mount the unit with two M4 flat countersunk head screws and nuts.



When using the included set of the installation screws to mount the install unit

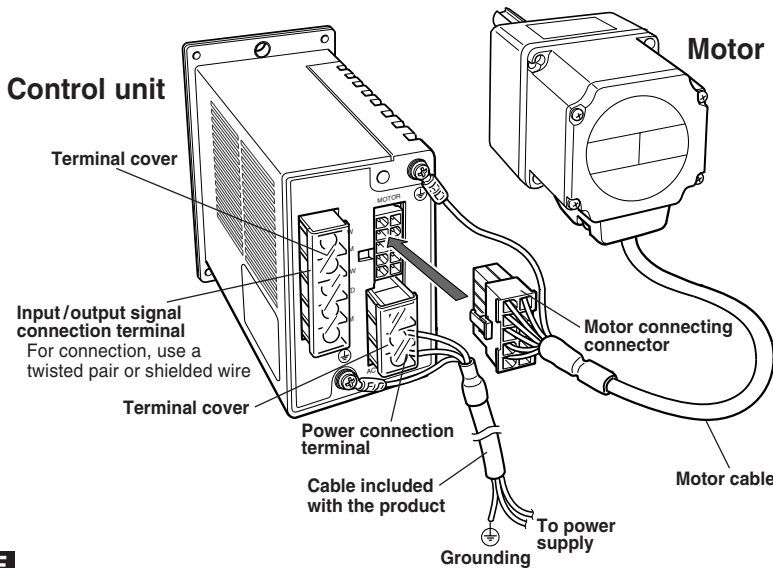
Remove the front panel according to the steps shown in “How to remove front panel” on page 8 (upper position), and mount the control unit. Use a plate 2mm (0.08in) or less in thickness.



NOTE

Use a tightening torque of 0.7N·m (99.4 oz-in) or less for the screws. Tightening them at a torque above 0.7N·m (99.4 oz-in) could damage the control unit.

Connection



NOTE

After shutting down the power, wait at least 10 seconds before turning it back on, unplugging, or plugging in the motor's cable connector.

Motor connection

Insert the motor cable connector into the motor connector of the control unit. Insert it until a click sound is audible, and connect it firmly.

To expand connection between the motor and controller, use the optional extension cable. Connection can be extended to a maximum of 10.5 m (34.4 ft).

Power connection

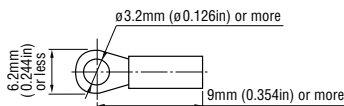
Connect the power cable to the control unit. Connect the red lead wire and black lead wire to the power connection terminal, and the green/yellow lead wire to the protective earth terminal.

For the power cable, use the attached power cable or a cable with a diameter equivalent to AWG 22 (0.34mm²) or more.

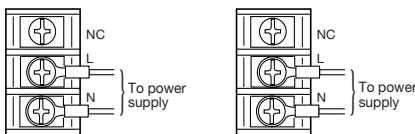
For the protective earth cable, use a cable with a diameter equivalent to AWG 18 (0.75mm²) or more.

For connection, use the insulated round crimp terminal.

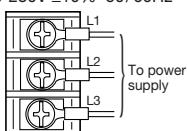
< Applicable crimp terminal >



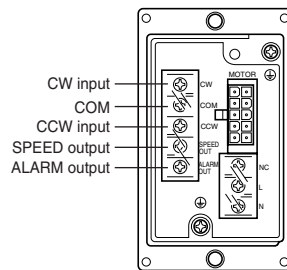
- **Single-phase 100 to 115V**
Single-phase
100-115V ±10% 50/60Hz
- **Single-phase 200 to 230V**
Single-phase
200-230V ±10% 50/60Hz



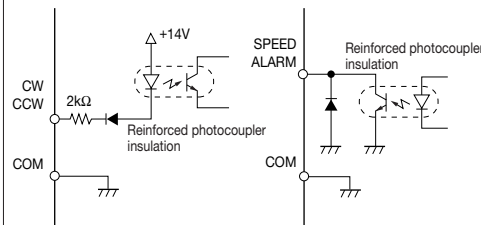
- **Three-phase 200 to 230V**
Three-phase
200-230V ±10% 50/60Hz



Input/output signals



- **Input circuit (Internal circuit)**
- **Output circuit (Internal circuit)**



The direction of rotation is the direction where the motor output shaft is driven when viewed from the motor output shaft side.

The direction of gear output shaft rotation may be the reverse of the motor drive direction, depending on the speed reduction ratio of the gearhead.

NOTE

- When you want to extend the input/output signal cable, the length must not exceed 2m (6.6ft). The cable should be as short as possible in order to minimize noise.
- The input/output signal cable should be connected to run perpendicular to the power cable and motor cable, not in parallel with the power cable and motor cable.

Speed output

Concurrently with motor drive, the system outputs pulse signals (with a width of about 0.5 ms) at 30 pulses per rotation of the motor output shaft. You can measure the speed output frequency and calculate motor speed.

$$\text{Motor speed (r/min)} = \frac{\text{Speed output frequency (Hz)}}{30} \times 60$$

$$\frac{1}{T} = \text{speed output frequency}$$

If you want to indicate or monitor the motor output shaft speed and determine the speed of the gearhead output shaft, use an optional digital speed indicator **SDM496**.

ALARM output

In the following cases, the protection function of the control unit is enabled to turn on the ALARM output (level H) and to stop the motor.

In this case, the LED flashes or lights up to allow the protection function to be checked.

* It is normal that the LED lamp will turn on in a moment of the connection with power supply.

- **LED lamp flashes when the following protection function**

Overload protection function

The LED lamp flashes when a load in excess of the rated torque is applied to the motor for about 5 seconds or more, or when the motor is instantly stopped or when the direction of rotation is switched repeatedly in a short period of time.

- **LED lamp ON when the following protection function**

Open-phase protection function

Prevents motor malfunction when the sensor cable within the motor cable is disconnected during motor operation. (An alarm signal will not be output while the motor is at a standstill.)

Overvoltage protection function

When the motor is used in an elevating/lowering application or with a load in excess of the permissible load inertia, or when voltage applied to the control unit has exceeded the voltage setting (115VAC or 230VAC) by 20% or greater.

Insufficient voltage protection function

When voltage applied to the control unit is less than the voltage setting (100VAC or 200VAC) by 30% or greater.

Overspeed protection function

When motor speed has reached an excess of 2800 r/min.

When electrical connection is made as shown in the example of connection, the ALARM output is on the level L if the control unit is normal (OFF), and is on the level H in the event of alarm.

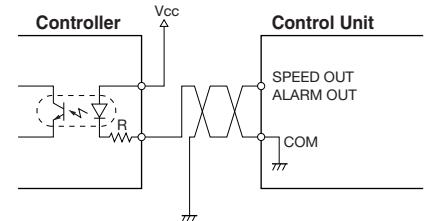
When alarm output is on (level H), turn off the control unit power after the motor has stopped.

If the motor cable is free of any trouble, check the operating conditions (load torque, running pattern and power supply voltage).

After removing the cause for activating the protection function, turn on power again and reset the alarm.

NOTE

Signal output is open collector output. Use the power source of 26.4 VDC or less to connect the limit resistance (R) so that output current does not exceed 10mA.



Running

Precautions for use

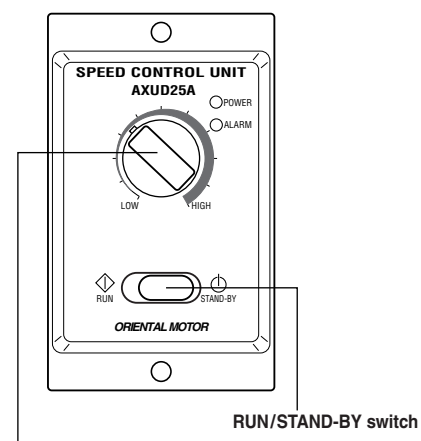
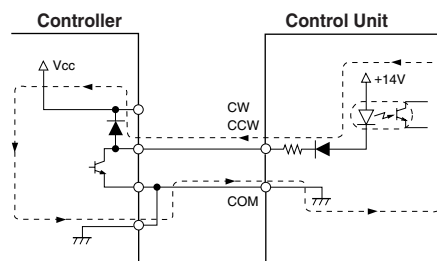
■ Do not use a solid state relay (SSR) to turn on or off power. The motor control unit may be damaged if it is used.

■ When you want to use the controller with a built-in clamp diode, pay attention to the sequence of turning on or off the power.

Power ON: Controller ON → Control unit ON

Power OFF: Control unit OFF → Controller OFF

If the control unit power is turned on first when connected as shown on the right, or the controller power is turned off with the control unit power turned on, current will be applied, as indicated by arrow mark of the diagram, and this may cause the motor to be driven. When the power is turned on or off simultaneously, the motor may be driven temporarily due to differences in power capacity. The controller power must be turned on first, and control unit power must be turned off first.



RUN/STAND-BY switch

Speed setting potentiometer

Turning the potentiometer in the clockwise direction causes the speed to be increased. The speed can be set in the range from 100 to 2000 r/min. It is set to 0 r/min at the time of shipment.

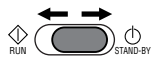
NOTE

- The RUN/STAND-BY switch is not a power ON/OFF switch. When you want to stop the motor for a long time, turn off the control unit power.
- Wait at least 1 second after the power is turned ON, then operate the motor. The motor will not run if RUN input or CW (CCW) input is turned ON within 1 second.

Running by the RUN/STAND-BY switch of the control unit

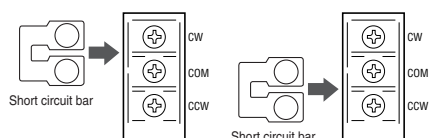
(Use the short circuit bar.)

When the RUN/STAND-BY switch is set to the RUN position, and the motor is driven. When it is set to the STAND-BY position, the motor will stop. Operation is not performed in the STAND-BY mode.



Drive direction depends on how the short circuit bar is connected.

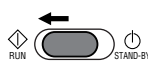
- Clockwise direction
- Counterclockwise direction



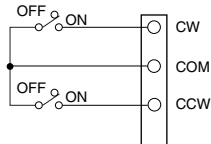
Connect the attached short circuit piece between the CW and COM or CCW and COM. Do not use the short circuit bar for other purposes.

Running by external signals

Set the RUN/STAND-BY switch to the RUN position.

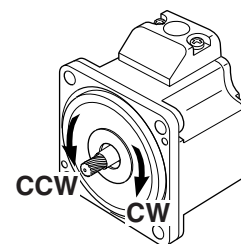
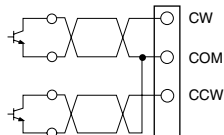


Small-capacity switch and relay



Use a small-capacity contact type relay capable of opening and closing 12 VDC, 5mA.

Transistor output type controller



● Clockwise drive

When CW input is turned on (level L), the motor is driven in the clockwise direction. When CW input is turned off (level H), the motor is stopped.

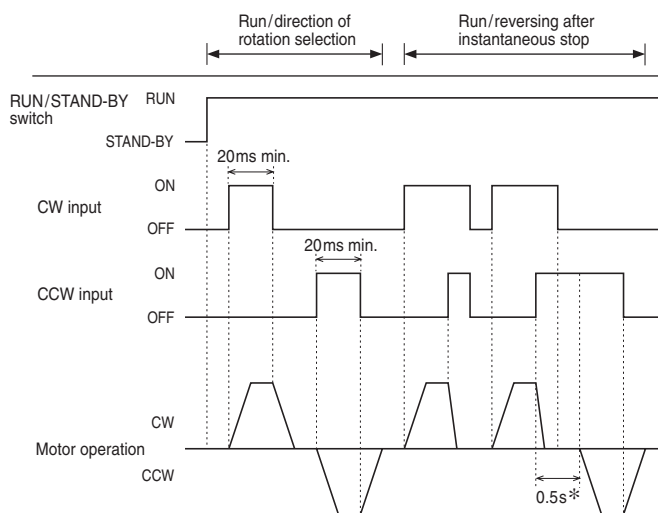
● Counterclockwise drive

When CCW input is turned on (level L), the motor is driven in the counterclockwise direction. When CCW input is turned off (level H), the motor is stopped.

- ◆ When both the CW and CCW inputs are turned on (level L), the motor is stopped instantly. The motor cannot be reversed instantaneously.

Timing chart

- Running by external signal



NOTE

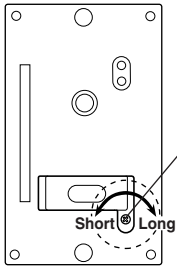
The CW and CCW input signals must be ON for at least 20ms.

When both the CW and CCW inputs are turned on, the motor is stopped instantaneously.

*Motor does not run for 0.5s after instantaneous stop, if a reversing run signal is input.

■ Setting the slow start/slowdown time

The motor starts slowly when it starts up, and stops slowly when it stops. This slow start and slowdown time can be set within the range from 0.5 to 10 sec. (2000 r/min without load).



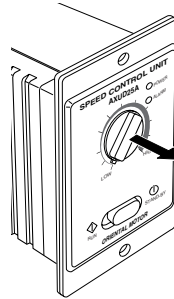
Slow start/slowdown time setting potentiometer

Time is increased by turning the switch in the clockwise direction. Use a insulated Phillips screwdriver for this operation. The shortest time is selected at the time of shipment.

■ How to remove front panel

Remove the control knob of the speed setting potentiometer.

Put a screwdriver (⊖) or the like between the front panel and the control knob. Then, pull the control knob toward you, and it will be removed. (Keep the knob completely at the LOW position.)

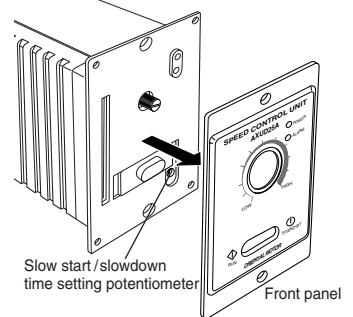


Remove front panel

Hold only the front panel, and pull it toward you. Then the front panel can be removed.

In this case, the RUN/STAND-BY switch is also removed together. Care should be taken not to lose it.

Reverse the above steps if you want to install the front panel.



Trouble diagnosis and countermeasures

The motor and control unit may not operate correctly during motor operation due to speed setting error or electrical connection error. If the motor cannot be driven correctly, take the appropriate measures according to the following Table. If correct motor operation cannot be regained despite such measures, contact our sales office.

Trouble	Possible cause	Measures
The motor fails to rotate.	<ul style="list-style-type: none"> ● The RUN/STAND-BY switch is set to the STAND-BY position. ● Both CW and CCW inputs are turned on. ● The speed setting potentiometer is not adjusted. ● The protection function has been activated. (ALARM LED lamp flashes or lights up.) 	<ul style="list-style-type: none"> ● Set the RUN/STAND-BY switch to the RUN position. Turn on either CW or CCW input. ● Turn off either CW or CCW input. ● Turn the speed setting potentiometer slightly in the clockwise direction. ● Check for the cause of the protection function activation and take the appropriate measures.
The motor turns in the direction opposite to the specified one.	<ul style="list-style-type: none"> ● The CW input and CCW input are incorrect or electrical connection is wrong. ● The motor rotates in the opposite direction, depending on gearhead speed reduction ratio. 	<ul style="list-style-type: none"> ● Supply correct input signals. When CW input is at level L, the motor shaft rotates in the CW direction. When CCW input is at level L, it rotates in the CCW direction. ● Reverse the CW and CCW input operations. [Rotating opposite of motor direction] GN type : 1/25, 1/30, 1/36 GU type : 1/12.5, 1/15, 1/18, 1/75, 1/90, 1/100, 1/120, 1/150, 1/180
Motor operation is not stable. There is much vibration.	<ul style="list-style-type: none"> ● The centerline is not aligned between the motor (gearhead) output shaft and load shaft. ● The motor and gearhead are not assembled correctly. 	<ul style="list-style-type: none"> ● Check the connection between the motor (gearhead) output shaft and load shaft. ● Check how the motor and gear head are assembled. Also check pinion shaft type.

● Please contact your nearest ORIENTAL MOTOR office for further information.

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